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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,231	02/01/2001	Han-Sin Lee	SAM-167	9048

7590 03/23/2004

MILLS & ONELLO, LLP  
ELEVEN BEACON STREET  
SUITE 605  
BOSTON, MA 02108

EXAMINER
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POMPEY, RON EVERETT

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 03/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/775,231

Applicant(s)

LEE ET AL.

Examiner

Ron E Pompey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-2 and 4-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)     | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2 and 4-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laparra et al. (US 6,319,796) and in further view of Park et al. (US 6,326,282) and Shin et al. (US 6,184,077).

Laparra discloses the steps of:

For claims 1, 2 and 4-6:

etching the exposed semiconductor substrate, using the etching mask pattern as an etching mask, to form a trench;

providing a material layer (40b, fig. 4) on the insulating layer (40a, fig. 4) filling the trench;

planarly etching the material layer and the insulating layer down to a top surface of the etching mask pattern to form a device isolation layer pattern in the trench; and

removing the exposed etching mask pattern (col. 4, Ins. 5-10 and col. 5, Ins. 51-56).

3. Laparra discloses all the steps of claims 1-12 except those described below.

However Park discloses the steps of:

For claims 8-12:

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prior to forming the insulating layer:

forming an oxide layer (112, fig. 2D) on the inner wall and bottom of the trench;

forming an oxidation barrier layer (114, fig. 2D) on the oxide layer; and

further comprising forming a capping layer (115, fig. 2D) between the oxidation barrier layer and the insulating layer (col. 4, Ins. 29-52).

Therefore it would have been obvious to those of ordinary skill in the art to combine Park with Laparra, because the layers disclosed by Park are protection layers for the trench.

4. Laparra and Park disclose all the steps of claims 1, 2 and 4-12 except for the material layer being formed being formed at a temperature of 700°C - 800°C and forming a etch-stop layer comprising polysilicon and a HTO layer which are sequentially stacked. However, Shin, column 5, lines 12-18, discloses that an LPCVD method comprises forming monosilane and dichlorosilane HTO and TEOS films at high temperatures in the range claimed by applicant. Therefore, Shin provides a specific temperature for different LPCVD layer, HTO and TEOS films, whereas Laparra just discloses the general conditions that the layer 40b is formed by a LPCVD method, which includes, but not limited to, TEOS. Park even says, column 3, lines 14-15, state that, "A high temperature oxide layer such as HTO and LP-TEOS oxide layers...", HTO and LP-TEOS layers form high temperature oxides. Therefore, from these two references HTO and LP-TEOS are considered as art equivalent layers. Also, that it would have been obvious to one having ordinary skill in the art at the time the invention was made to form an etch-stop layer, comprising polysilicon and a HTO layer which are

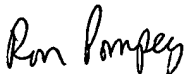
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sequentially stacked, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (571) 272-1680. The examiner can normally be reached on flex schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Ron Pompey  
AU:2812  
March 21, 2004

  
John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2800